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ABSTRACT

A survey of medical and allied health libraries in North Dakota was made between July 1 and September 30, 1973, to define for the state's expanding medical education programs the goals and plans for the learning resources and health science library phase of the program. Part I of the survey involved the correlation of the aims and goals of North Dakota medical education programs with generally accepted guidelines for medical library development. Questionnaires were also distributed to health care personnel to elicit their opinions about the scope of resources and services desired in a health science library. Part II of the survey involved the on-site evaluation of predominantly medical and health-related library facilities within the state, examining them according to four categories which correspond to sections of the Association of American Medical Colleges (AAMC) guidelines: library resources, library services, physical facilities, and personnel. Results indicated that the greatest present need is the recruiting of qualified library personnel. Recommendations are made for library development to ensure access to basic library services for every health professional in the state and for the establishment of a North Dakota Health Science Information Network. (Author/SL)

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HEALTH SCIENCE LIBRARIES IN NORTH DAKOTA

Report of a Survey and
Recommendations for Future Development

Prepared for the University of
North Dakota School of Medicine
by Elizabeth W. Bruce, M. A.

October 1, 1973

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STATE LIBRARY COMMISSION

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PREFACE

This report results from a survey of medical and allied health libraries in North Dakota, made at the request of Dr. John W. Vennes, Acting Dean of the School of Medicine of the University of North Dakota. The surveyor, then Director of the Health Science Library, University of Alabama at Tuscaloosa, was asked to assess existing library resources for the developing medical and allied health education programs and to recommend possible lines of future development.

The primary emphasis of the survey and report is the designing of an information support service for North Dakota which can equalize access to health science information, both in print and non-print media, for all of the state's health professionals.

The plan for development described herein is not the final Plan for Health Science Library Development in North Dakota. A committee to represent library users and to recommend plans for future development, the North Dakota Health Science Library Advisory Committee, was formed in January 1974.

This report is being distributed by the North Dakota State Library in order to make its contents more widely available in the state, primarily for the purposes of discussion.

September 1974.

TABLE OF CONTENTS

	Page
Introduction	i
I. Survey of Medical Libraries in North Dakota	1
Library Resources	2
Library Services	4
Physical Facilities	7
Personnel	9
II. Alternatives for Library Development	12
Levels of Service Capability	13
Service Capability in North Dakota	14
IV. Recommendations for Library Development	18
Levels of Library Service	18
1. Provision of fast and reliable Interlibrary Service throughout the State.	19
2. Development of the most useful kinds of Union Catalogs and Union List of Serials.	21
3. Establishment of Bibliographic Centers in North Dakota.	22
4. Organization of Cooperative Storage Facilities	24
5. Coordination of library activities to facilitate Cooperative Technical and Reference Services	25
6. Center for Comprehensive Information Service	32
Specific Recommendations for Personnel, Library Resources, and Physical Facilities	34
Sources of Funding	36
Minimum Requirements	36
Evaluation	37
Postscript	38
IV. Calendar for Development: 1973-1978	40
References	43

INTRODUCTION

In 1965, the President's Commission on Heart Disease, Cancer, and Stroke (1) reported that:

> "The disrepair of the medical library system, so essential to the transmission of medical knowledge across time and space, constitutes a major weakness in both Federal and private health and medical programs....
>
> The deficiences in medical communications, particularly in the Nation's medical libraries, affect the activities of 3 million medical and paramedical personnel. The effect of the weaknesses of the medical library system on medical research, teaching and practice should be recognized as threatening....
>
> Inefficiency in the medical library network creates an insidious ignorance which neither science nor the practice of medicine can condone. It results in the unplanned and unnecessary duplication of research efforts. It postpones the application of new knowledge potentially important to the alleviation of human suffering."

This less-than-happy state of affairs developed concurrently with, and perhaps was caused by, the enormous explosion of biomedical information which has been produced and published since the end of World War II. There are now over 20,000 serials being published in the related fields of the health sciences, and an average of two new titles are born every week. Of the 20,000 titles, approximately 9,000 are considered substantial. Index Medicus contains only about 2,400 of these journals, so that access to the scholarly record in medicine and its related disciplines is increasingly difficult.

These conditions of the exponential growth of biomedical literature coupled with the incapability of handling that literature in any comprehensive manner have allied to produce an untenable situation for the medical library user. The

biomedical researcher has retreated into increasingly narrower specialization, while the busy practicing physician finds it impossible to read all of the journals and textbooks that cross his desk. Both are further confused by the plethora of new types of media demanding attention - tape cassettes, audio-visual self-learning packages, closed-circuit television, programmed instructions home study courses, and many more.

To compound the problem, the physician has been told that the "half-life" of his medical knowledge is seven years, and he must actively pursue opportunities to continue his education. Increasingly the physician is having to face the probability that continued membership on the hospital medical staff and in the state medical association, or even relicensure, may depend upon his continuing participation in postgraduate medical education. He is aware that his need for biomedical information is increasing as fast as the demands upon him for patient care.

A complex relationship exists between the organization of biomedical information for easiest possible access by its users and the quality of the delivery of health care to the people of a community or to a country. At the present time, when the literature is full of references to such topics as self-assessment, peer review, practice profiles, medical audit, and continuing education, all contributing to better quality of care, perhaps the most important of all factors in any medical education program is simply the provision of access to good biomedical libraries. This access to biomedical and related health sciences information is a basic factor in the continuing education of all health professionals. Until very recently, however,

access to a comprehensive collection of biomedical literature usually was an amenity enjoyed only by physicians and other health professionals based at a large, urban, academic medical center.

During the same period that the organization and dissemination of biomedical information was seen to be inadequate when assessed on a national basis, health care delivery is criticized as having experienced a similar decline. Garrison (2) speaks of a rapidly widening hiatus between existing medical knowledge and the delivery of medical care to citizens of our nation. During the past twenty years a large amount of completely new knowledge applicable to health care has been developed, but our methods for delivering these beneficial medical services have become grossly inadequate, and in some ways have actually deteriorated. Attributing this condition to an inadequate supply of family-oriented or front-line medical practitioners, the writer describes professional isolation as the major reason for the rejection of primary practice by many physicians.

The major factor making rural areas unattractive to a young physician in deciding the location of his practice is generally considered to be a fear of such isolation. Wilson (3) cites an American Medical Association survey conducted in 1966 which shows that rural communities, particularly isolated communities, have on the average only one half as much access to health resources as the rest of the country. The experience of North Dakota, with a physician-population ration of only one-half the national average, bears this out. In a recent report in the Journal of the American Medical Association Mason (4) cites a national study, the

findings of which indicate that the problem is more than merely attracting young physicians. Rural communities face a greater task in persuading physicians to remain than in attracting them in the first place. His findings indicate that physicians will continue to reject inner city neighborhoods on the one hand and small towns and rural areas on the other because as a group they place a high value on the geographical attributes of the setting for medical practice. North Dakota is the most rural of all the states with over 95% of its land devoted to agriculture; for this reason a state-wide or region-wide effort to improve health care in North Dakota should place special emphasis on methods of overcoming the experience of professional isolation for health care professionals.

An important means for overcoming the professional isolation of health care personnel is the provision of the kind of biomedical information facilities which can give the same quality of service to the health practitioner in a rural area as in an urban medical center. When information is needed to facilitate health care delivery, it should be conveniently available. A viable library network should provide every physician in every county in the United States with access to the world's biomedical literature.

The condition of medical libraries reported by the President's Commission on Heart Disease, Cancer and Stroke gave rise to legislation of great importance to biomedical library development. Among the laws significant for library development are the Heart Disease, Cancer and Stroke Amendments of 1965 and the Medical Library Assistance Act of 1965, which was extended by the Medical Library Assistance Extension Act of 1970, and extended again for one year in 1973.

The Medical Library Assistance Act of 1965 provided for the establishment of the first truly national library system, and has had repercussions in other fields of library effort in addition to medicine. This Act authorized the National Library of Medicine, through grants, to provide funds to health science libraries and related agencies to accomplish the following objectives: a. to improve collections and services; b. to build new libraries or to renovate old ones; c. to develop new programs for education and training of information specialists and librarians; d. to conduct research in the way information is stored, retrieved, and transmitted; and e. to create a national network of Regional Medical Libraries. (5)

As a result of increased federal funding for medical libraries, the health science library community has been able to raise its standards for its own performance and to provide better service to medical and allied health practitioners. Funds have been spent to improve library buildings and to provide for research in designing better library facilities; between 1965 and 1970 grants totaling some $11.2 million were made to support the construction of eleven health science libraries in educational institutions throughout the country, providing 330,000 square feet of new medical library space. Many grants have provided for the improvement of collections and other resources in both large and small libraries; during the same five-year period, nine regional library awards totaling $5 million were made to organize health information services in cooperative regional partnerships, designed to utilize the country's biomedical resources more effectively.

Federal funds have been used effectively to improve the educational standards of medical librarians. In 1965 the United States had 6,000 medical libraries

but fewer than 3,000 trained librarians to staff them. Under the Medical Library Assistance Act some twenty graduate and postgraduate training programs were set up at graduate library schools and major medical libraries to teach current concepts of information processing with special reference to medical libraries. Graduates of these programs are eligible for certification as medical librarians by the Medical Library Association.

While the health science library community has become better able to serve the information needs of physicians located in or near academic medical centers, the patterns of medical education have been changing. Given impetus by the Carnegie Commission report of 1970 (6), planners of new programs of medical education are speaking of the regionalization of academic medicine. The new challenge to the health science library community is the concurrent regionalization of its resources and services to serve new patterns of needs for biomedical and related information. As medical education in many locales begins to be organized around Area Health Education Centers, the demands upon professional personnel in the several biomedical communications fields will be greater than any with which they have previously had to deal.

In a recent issue of the Journal of Medical Education Pellegrino (7) writes:

> "....one of the oldest and firmest assumptions in need of revision is that the academic health sciences center is a place and that all health professionals must be educated largely in that place. Instead, we must see that academic health sciences center as an organizing principle by which a network of institutions of great variety can be organized, each carrying out that part of the total educational task for which it is best suited. It is the totality, then, that constitutes the academic health sciences center, and not just the energizing core, which is the academic

> center and its university hospital. By embracing a large variety of institutions, the academic health center can have a much more pervasive influence than is now possible on the quality of care in its region and can more closely match manpower production to regional needs."
>
> "....a communications network is absolutely essential as the nervous system, without which these new academic organisms will fail to act cohesively. The geographic impediments to information transfer, interpersonal communication among key personnel in the participating institutions, committee participation and governance, and sharing of teaching and library resources must be obviated. A well functioning communications network is an essential first step. It will also be the first point of dysfunction when the system of interrelationships begins to deteriorate. The technical and organizational requirements for effective educational networks are considerable, but workable plans and programs are beginning to appear."

Pellegrino pinpoints two of the most serious problems which the health science library community will have to solve in order to adjust to the new patterns emerging in medical education. The first, which here too needs revision, is the concept of "place" in thinking of biomedical libraries, rather than putting emphasis on a complex of resources and services based in several related locations. The other deals with the communications network essential to a diversified program of medical education. Library service, as the most institutionalized component of that network, is in danger of failure to be flexible enough to meet the information needs of a region, and in this respect would contribute to the dysfunction of which Pellegrino speaks.

Each local library in a regionalized program of medical education should envision for itself two purposes: 1. to provide resources for the information needs of programs of undergraduate medical education for medical school students; and 2. to coordinate and provide information resources for, and to assist member

institutions in the conduct of, programs of graduate medical education, continuing medical education, and the education of allied health personnel. The librarian needs to understand the multiple factors of geographical and professional isolation, which he can alleviate by means of specially tailored programs for individual physicians that go above and beyond such traditional services as interlibrary loan. These factors bear a direct relationship to the work of health science librarians, whose stock-in-trade is the means to facilitate communication and to overcome isolation. No other professional is potentially so well equipped to offer this particular dimension of service.

The health science librarian can be an integral member of the health care team. By communicating with resource libraries and other sources of information, and by delivering this information in its most useful form, the librarian may make a very real and important contribution to the delivery of health care, even in the smallest communities.

I. SURVEY OF MEDICAL LIBRARIES IN NORTH DAKOTA

A survey of medical and allied health libraries in North Dakota was made during the three-month period between July 1 through September 30, 1973. The purpose of the survey was to define more clearly for the expanding medical education program the goals and plans for development of the learning resources and health science library phase of the program.

Part I of the survey involved the correlation of the aims and goals of the North Dakota medical education programs, as described in the North Dakota AHEC Contract Proposal, the Medical School Conversion Grant Proposal, and other documents, with generally accepted guidelines for medical library development. These include "Guidelines for Medical School Libraries", prepared by a joint committee of the Association of American Medical Colleges and the Medical Library Association, (8) "Objectives and Standards for Special Libraries", (9) and several others.

The first part of the survey also included the distribution of a questionnaire, sent to 890 physicians, nurses, and clinic, hospital, and public health administrators across the state. The purpose of the questionnaire was to elicit the thinking of the health-care community about the scope of resources and services desired in a health science library. 359 of the questionnaires were returned, giving a response rate of 40%.

Part II of the survey involved the on-site evaluation of predominately medical and health-related libraries and learning-resources facilities in North Dakota, primarily in the cities of Bismarck, Fargo, Grand Forks, and Minot. In order to

facilitate the evaluation a staff member in each of the libraries which employs such a person was asked to fill out a second set of questionnaires, developed by the Medical Library Association and the National Library of Medicine, and designed to provide detailed information about the scope of each local library's resources and services.

Medical and related health libraries in North Dakota were examined according to four categories which correspond to sections of the AAMC Guidelines: Library Resources, Library Services, Physical Facilities, and Personnel. The examination was made in terms not only of present conditions but also of the demands upon the libraries likely to be exerted by the expanded health education programs, which will include an undergraduate fourth year elective program in the basic fields of internal medicine, pediatrics, obstetrics-gynecology, psychiatry, and surgery, and additional elective opportunities in radiology, urology, pathology, neurology, orthopedics, anesthesiology, otolaryngology, and physical medicine and rehabilitation. New and expanded programs which must be served by library services are residency training in primary care and other fields and continuing education for both physicians and other health professionals. In addition the libraries in each AHEC area must provide learning resources to support clinical instruction and technical training for nursing and allied health students, and basic materials for pre-professional education.

Library Resources

The eight largest medical and health related libraries in North Dakota which employ at least one part-time staff member are: In Grand Forks, the

Harley E. French Medical Library of the University of North Dakota, and the United Hospital Library; in Bismarck, the Quain and Ramstad Clinic Library; in Minot, the Angus L. Cameron Memorial Library; and in Fargo, the North Dakota State University Pharmacy Library, the St. Luke's Hospital Library, the Veterans Administration Center Library, and the Dakota Clinic Library. They hold a combined total of 1,337 journal titles, ranging from a high of 509 to a low of 66. Most of these titles are duplications of those in the other libraries, so that there are probably between 650 and 750 different titles presently received in the state. These collections contain most of the "core" titles, considered basic to a collection in the medical sciences. When one considers, however, that there are approximately twenty thousand current titles in the medical and related health sciences, with about two new titles appearing every week and about 9,000 judged important, it is clear that with better coordination of the collections North Dakota could have wider coverage of the literature for the same expenditure.

The eight libraries have collected a combined total of 78,015 bound volumes, including bound volumes of journals and other serial literature, textbooks, and monographs. These range from a high of 35,218 down to 2,000. At the present time no library in the state is large enough to provide a comprehensive range of bibliographic apparatus, which should include all of the indexes in English. Today these materials are too expensive to be duplicated indiscriminately.

The eight libraries collect very little audiovisual material, although on the questionnaires 18 health professionals asked specifically for help in this field. Bibliographic control of audiovisual software, either locally or on a state-wide

basis, appears to be non-existent.

In general North Dakota's health science libraries have the core materials and resources basic to a good clinical collection, although fully 188 of 359 questionnaire respondents listed specific types of literature which they are unable to obtain at the present time. Following general guidelines (10, 11) the state's libraries should immediately augment their health sciences collections to a combined total of 100,000 bound volumes and 1,500 journal titles. Without planning and coordination, however, the state will need to duplicate several large libraries at different locations.

Library Services

Library services fall into two major categories, technical services and information or reference services. Technical services involve the processes of acquiring, organizing, and housing the library materials. At the present time the personnel working in North Dakota's medical libraries spend an inordinate amount of time and effort at this task. They seem in general to lack information on improvements in cataloging practices or on recent changes in library technology which facilitate the processing of library materials.

The libraries use a variety of classification systems, three of the eight largest using that of the National Library of Medicine and two using that of the Library of Congress. Most of the small "doctors' conference room" libraries and one of the larger ones use no classification system.

Of the information or references services, interlibrary loan with related document delivery is the primary service offered to North Dakota's health

professionals at this time. Only three of the eight libraries could provide records of the interlibrary loan transactions requested by their libraries for patrons during the past three fiscal years. Library A and Library B experienced roughly the same ratio of growth in this area while Library C had fewer requests in the third year:

	1970-71	1971-72	1972-73
Library A	128	257	396
Library B	82	181	222
Library C	95	173	123

Interlibrary loan demands on these libraries and the others in the state are likely to increase to a marked degree with the expansion of the medical education program.

Only Libraries A and B could furnish statistics for the number of requests filled for other libraries:

	1970-71	1971-72	1972-73
Library A	565	1045	1140
Library B	---	21	20

These figures are also likely to increase greatly in the near future. Many of the libraries keep no statistics and so have no records of trends in usage nor any basis upon which to plan future development.

Many of the libraries report offering the following information services: General library reference service, manual literature searching, the compiling of bibliographies, editing, photocopying, and some ordering of books for individuals

on the staff of the hospital or clinic. The Harley E. French Medical Library at the University of North Dakota, as the resource library for the state, offers these services plus Medline searches through the Midwest Regional Medical Library. It is interesting that many of the health professionals responding to the questionnaire asked if any of these services were available or complained of lack of access to them.

Clearly reference services at these libraries need coordination into a state-wide system in order to equalize access to them. In addition augmentation of information services is required in certain areas. At the present time no reference work requiring the expertise of information specialists is being done. None of the libraries report providing a translation service, and yet several of the questionnaire respondents indicated a need for foreign literature in translation. None report instruction by library staff in information handling skills for library users or potential users, yet this is a basic service emphasized strongly in the AAMC Guidelines (8).

The health professionals' responses indicate use patterns which bypass local libraries for slower service from libraries some distance away. Although most libraries reported service to unaffiliated groups, a failure to advertise such services or to make access to them as convenient as possible will be detrimental to the expanded medical education program. Coordination of information services of all of the health science libraries in North Dakota, in addition to cooperative acquitions and cooperative technical processing, will help to equalize access to information among the state's health professionals.

Physical Facilities

Location.

In all but one city users' questionnaires answered the question: Where should the AHEC libraries be located? In Grand Forks the Harley E. French Medical Library received the greatest number of votes. The Quain and Ramstad Clinic Library in Bismarck and the Angus Cameron Library in Minot are strongly supported by the physicians in their areas as the most likely locations of expanded health science libraries. Personal inspection bears out the collective opinions of the questionnaires, for in their cities there are no other health science libraries able to give the services that these three can give.

In Fargo, however, many locations were suggested, often by the same respondent. No library is a clear-cut leader in providing health science information to the community as a whole. A study group of interested persons should be formed to assess the local situation in depth and make recommendations for a comprehensive, community-wide health science library in Fargo.

Space Requirements.

Virtually all of the libraries visited have space problems. Library materials are either overcrowding shelves (and in some cases are stacked on tables or on the floor) or have recently been removed from the accessible collection to alleviate the overcrowded conditions.

The most serious space problems, however, are in the reading room areas. The reading rooms should provide seating space for approximately one quarter of the library's potential users, and one reader requires about thirty square feet (12).

Seven of the eight medical and allied health libraries reported both the number of their potential users and the amount of square footage available in their reading rooms; the Cameron Library reported only the number of its potential users and is excluded from this computation. Those seven report a total number of 4, 372 potential users at the present time. This figure includes only those users with an immediate relationship to the library, leaving out such unmeasurable groups as "all MD's and health professionals in the area". The same seven libraries report a total of 3, 993 square feet. One quarter of potential users is 1, 093, multiplied by 30 square feet, giving a figure of 32, 790 as the minimum number of square feet of reading room space required by those libraries at the present time. The seven libraries therefore have an immediate need for at least 28, 797 additional square feet.

When the figures are broken down by city and principal library, the shortage of reading room space can be seen as a state-wide problem:

city & lib.	potential users	$\frac{1}{4}$x30= sq. ft. needed	present sq. footage	additional sq. footage needed
Grand Forks				
UND Med.	1, 550	11, 640	1, 173	10, 467
Bismarck				
Quain & R.	1, 158	8, 700	300(?)	8, 400
Minot				
Cameron	490	3, 690	NA	
Fargo				
St. Luke's	789	5, 910	560	5, 350
NDSU Pharm.	746	5, 670	840	4, 830
VA	118	900	344	556
Dakota Cl.	34*	270	216	54
			Fargo Total	15, 790

*This figure is low because no allied health personnel were reported.

There is room for physical expansion at the Quain and Ramstad Clinic Library in Bismarck and at the Cameron Library in Minot. The University of North Dakota clearly needs a new Health science library, as does the Fargo area. In planning these facilities, it should be remembered that a new library attracts much more use than the facility which it replaces, so that space for future growth should be allowed.

Wherever possible the libraries which serve nursing and other allied health programs should be integrated with the medical libraries. A paragraph from the AAMC Guidelines (p. 33) explains the reasons for this:

> "A system of branch libraries specializing in certain subjects is expensive to operate or, if frugally supported, inefficient to use. The typical user comes to the library expecting to find his material in one place. It is desirable to include in the central medical library the materials used by the dental, nursing, pharmacy, and public health schools. A centralized medical library does not preclude the existence of departmental convenience collections, as long as they are recognized as being duplicate collections of frequently consulted books and journals, shelved conveniently close to the offices and laboratories of their principal users. Such convenience collections should be the responsibility of the department concerned rather than that of the central library administration."

Personnel

Many of the guidelines (8, 9, 13) agree that the quality of the library's personnel is the most important factor in the effectiveness of the library as an information center. No library can be operated efficiently without an adequate number of professional librarians.

To have professional credentials as a librarian requires a master's degree in library science from a library school accredited by the American Library

Association. In addition, the Medical Library Association maintains a program of certification as medical librarians for those graduates of library schools who pursue a special program in biomedical and health science librarianship, and who have had work experience in a medical library.

It is essential that every effort be made to acquire the services of a highly qualified chief librarian for any library, for he has the responsibility for planning the long-range programs of the library and is the single most important determinant of the quality of library services.

Other members of the professional library staff should have special competence in carrying out their responsibilities, which will include the selection of materials, the supervision of cataloging activities, reference and bibliographic services, and supervision of library assistants, trainees, and clerical staff.

Specialists other than librarians may be part of the professional library staff, including the literature searcher, the translator, the abstractor, the indexer, and the information systems specialist.

The ratio of professional staff to non-professional staff in a medical library is usually 1: 2. An experienced library administrator suggests that in a published literature library providing minimal service one staff member per 100 potential users might serve as a minimum standard; if special services such as journal routing, compiling of bibliographies, editing, and so on, are to be given, the minimum staffing would have to be increased (14). The eight principal North Dakota health science libraries report their number of potential users is presently 5, 905; they should therefore be employing 59 full time equivalent staff members rather

than the approximately 20 full time equivalent personnel now employed.

At the present time almost all of the personnel staffing health science libraries in North Dakota are non-professional librarians. Such staff can learn basic techniques in keeping records, but they seldom have the education or professional background to build collections and use innovative techniques in the dissemination of biomedical information.

Many of the present inadequacies in biomedical library services in North Dakota can be traced to the general dearth of professional librarians in the state's health science libraries.

Of the four AHEC areas Bismarck alone enjoys the services of a professional librarian eligible for certification by the Medical Library Association. In addition there are only a few librarians, who hold master's degrees in library science, serving in medical or other health science libraries in North Dakota.

The greatest present need in improving North Dakota's health science information system is the recruiting of well-educated, fully-trained, professional library personnel, who can work together on a state-wide basis. This recruiting should be begun immediately.

Although the state's health science libraries require improvement in all areas before they can adequately support an expanded medical education program, North Dakota has an important strength in having waited until the present time to begin full-scale health science library development. Many regions support several large and expensive medical libraries, which are finding their size and complexity an impediment to full cooperation. This state can avoid the mistakes of other states and regions and begin now to plan and develop a library support service with the highest cost-benefit ratio.

II. ALTERNATIVES FOR LIBRARY DEVELOPMENT

The alternatives for North Dakota's biomedical library development are many, but they are arrayed along a continuum rather than consisting of several discrete choices. The question essentially is: How far can North Dakota go at this time in utilizing existing library technology?

Along the continuum of library development there are certain distinct levels, however, ranging from uncoordinated "mini-libraries" operating as autonomous units at lower end, to a fully functioning library network operating with full cooperation among the individual libraries at the upper end. In the first case the autonomous libraries participate in a network only so far as using it as a document delivery system, and then only rarely. A fully-functioning network calls for true cooperation in every library activity, including all technical services and reference services.

The distinct levels of library development are products not of deliberate choices but of historical additions to the ancient concept of the library as a storehouse for the written word. These additions listed below, reflect six levels of increased service capability, and are graphic examples of the shift in emphasis from the storage of information to the dissemination of that information:

1. interlibrary loan
2. union catalog, and later, union list of serials
3. bibliographic center
4. cooperative storage
5. cooperative technical and references services
6. center for comprehensive information service

Levels of Service Capability

Interlibrary loan service grew out of the response to the need to obtain books or other materials not owned by the library which received the reader's request for them, and this activity dates from the Middle Ages. The union catalog contains the holdings of all the libraries in an area or a system, and each participating library maintains an up-to-date copy, whether in book form or as a card catalog. This service provides a larger bibliographic data base than the holdings of one library afford, and it has seen extensive development since the beginning of the twentieth century. Closely related to the union catalog, the union list of serials provides access to all of the journals and other serial titles held by participating libraries in an area or system.

The need to have access to materials not available locally but in existence in libraries outside the narrow geographical boundaries of the local union catalog led to the development of the library as a bibliographic center. This type of library maintains a greatly expanded collection of reference works, including many types of indexes, abstracts, and union catalogs from other areas, providing a much larger data base, with title, subject, and other kinds of access. The bibliographic centers began to provide another valuable service - storage space in the local area for materials from smaller libraries, books and journals which were seldom used but were sometimes needed and difficult to obtain.

From the practice of cooperative storage has come the idea of cooperative purchase of materials, either from a common fund or by means of the coordination of several acquisitions funds in the area. Other services developing concurrently

include cooperative processing -- classifying, cataloging, and preparing books and journals for the shelves -- and cooperative reference services, including on-line computer access to large data bases in several disciplines.

Coordination of cooperative services has the effect of producing an information network out of the formerly independent and autonomous libraries. Each large network then requires one or more resource libraries which can provide specialized services. The resource libraries necessarily are staffed with professional librarians, who, as subject specialists, compile specialized bibliographies, provide translations or at least access to translating services, offer "current awareness" services on a regular basis, and in addition make available a full range of audio-visual services, including such specialized capability as microcopying.

This capsule summary of library development provides a list of alternatives to anyone planning a library support service for an educational program. Any of the levels listed above can constitute a legitimate alternative for North Dakota's library development in the health sciences.

Service Capability in North Dakota

North Dakota's libraries presently participate in a nation-wide system of interlibrary lending and document delivery. Furthermore, those which participate to any extent use national, area, and statewide union lists of serials in order to determine the most convenient location of a needed journal title. Of the libraries in the state principally devoted to the health sciences, the holdings of ten are listed in the North Dakota Union List of Serials. In Fargo the holdings of the

library of the Veterans' Administration Center are listed in the Tri-College Union List of Periodicals. At present there is no comprehensive union catalog of biomedical and related health science holdings in North Dakota.

Health science libraries in North Dakota have a general level of competence at level one of service--filling interlibrary loan requests; but if the planners of library development elect to pursue the basic alternative of remaining with the present library situation, much augmentation is needed. North Dakota physicians emphasize two problems with the service at present. Those physically removed from a library have trouble "plugging in" to the system to place a request. One rural physician answered the questionnaires: "Your greatest service will be to those of us who are at present without any library." At this basic level the coordination of existing resources can greatly improve service. Ease of access is necessary to physicians in rural practice. In addition, the turn-around time from request placed to document delivered is often too long to make the system useful. One respondent asks. "What service time -- from request to filling request -- is now available?" Another states: "I can't see how four libraries can better serve my needs since I'll have to call or write for reprints anyway." The first requirement for library augmentation in North Dakota is the assigning of every health professional to an access point for the convenient requesting of materials. At this level of service many of these primary librarians could be public librarians, provided by the Medical School with continuing education and support services, so that they could more easily serve the needs of health professionals.

Physicians located in urban areas also expressed a need for improvement

in library resources and services. One located in the largest urban medical center in North Dakota says: "Access to journals we do not have should be unlimited, for to curtail such is to impede good teaching, research, and practice." Another in the same location responds: "Definite need for high quality medical libraries as a part of overall university facilities. No good speciality library in our area. The present reprint system is no substitute for a high quality library." Library augmentation to meet the information needs of these physicians can fall anywhere along the continuum from bibliographic center to functioning network. The Medical School can establish four centers with comprehensive reference and bibliographic collections, which could serve all but a small percent of the health-related requests in the state. This is the route that many states and regions followed during the 1950's and 1960's. The cost for duplicating such effort is all but prohibitive now, however, and the libraries of major medical centers are forming consortia and joining networks in order to prevent further duplication of effort.

At present there is no cooperative storage facility for health-related materials in North Dakota, although virtually all the libraries in the state would welcome access to such a service. No cooperative technical services activity has been developed, although many library staff personnel say that they would welcome help in cataloging.

Participation in cooperative reference service has largely been limited to requests for bibliographies sent through the French Library, UND, to the University of Minnesota Biomedical Library. The MEDLARS file at the National

Library of Medicine is a valuable resource that has barely been tapped in North Dakota; only one physician mentioned it on the questionnaire. Physicians are going out-of-state for medical information to the Universities of Manitoba, Minnesota, Nebraska, Colorado. California, the Mayo Clinic, the Library of Congress, the American Medical Association, the American Hospital Association, and others.

The alternative adopted as a model for health science library development in North Dakota should take into account the current unmet information needs the state's health professionals. Any planning for library development at one of the specific levels of current service capability should remain flexible to allow for future technological developments at the particular level. Specific recommendations for the health science libraries of North Dakota, designed to fill as efficiently as possible the information requirements of the state's health care community and related education programs, are offered in the next section.

III. RECOMMENDATIONS FOR LIBRARY DEVELOPMENT

Levels of Library Service

Before examining a list of specific recommendations it would be helpful to review the levels of library service capability discussed in the previous section:

1. interlibrary loan
2. union catalog, and union list of serials
3. bibliographic center
4. cooperative storage
5. cooperative technical and reference services
6. center for comprehensive information service

North Dakota now has the capability of delivering information service at the first level and partially at the second level. Some of the primarily medical libraries in the state have holdings of reference tools which could be coordinated to form a true bibliographic center, but these materials are not presently used in any such comprehensive manner.

It is recommended that North Dakota develop a capability of delivering information service fully through level 5 and partially through level 6. The large university hospitals treat only about 15% of the cases in this country, and yet those medical centers are the locations of practically all of the biomedical libraries that can deliver medical information on any comprehensive basis. Any state now planning to extend its undergraduate program of medical education to many communities throughout the state should plan first to extend information support services to those communities.

The Council on Medical Education of the American Medical Association recommends that a medical school library should (1) subscribe to at least 500

journal titles, (2) maintain a diversified collection of medical textbooks, and (3) offer the basic library services, including reference service, adequate technical services, document delivery service, and audiovisual service. North Dakota can offer this basic minimum, and much more, to every health professional -- and potential health professional -- in the state by coordinating the resources now available and adding to the services.

1. Provision of fast and reliable Interlibrary Loan service throughout the state.

The task of equalizing access to information is a complex problem; there are many routes, both formal and informal, which requests for documents and other sources of information take. The task in North Dakota should be to seek not to disrupt existing working routes, but experimentally to establish new routes and to develop a methodology of analysis and evaluation.

In a developing situation, short of professional staff, the state should make use of every non-professional with library work experience. The efforts of these "front-line librarians" will need to be coordinated in a state-wide pattern. They must be trained to do more "professional" work, clearly defined, in a local situation, and to pass a problem or request requiring special attention back to a more expert second line of help.

Of the questionnaires received, twenty suggested their own public library or that in a nearby city as the best site for a health science collection. It is interesting that several of these are physicians located in the four AHEC cities. The suggestion is a good one. The librarians of every academic and public library, in locations where there is no health care facility which can support a library, should

be enlisted to provide a contact for interlibrary loan service to every health professional in that area.

The state must provide support funds in order to make this expanded system feasible. Among the requirements would be the materials and resources necessary to do basic medical reference work. The contact libraries should be equipped with a core collection of medical reference books, a subscription to Index Medicus, and a set of Cumulated Index Medicus for the last few years. In addition, these locations should be provided with a subscription to Current Contents--Clinical Practice, as a selection aid for those who asked on the questionnaires, "Are there any lists of current articles available?"

The contact librarians, whether in public libraries or in local hospitals, must be offered workshops and continuing education opportunities in medical reference work, as well as visits to the larger libraries in their own interlibrary loan system, for having seen the facilities of the larger library and talked to the staff breaks down reluctance to ask for information and service. An initial annual budget of $20,000 should be set up to provide resources and services to contact libraries.

The product of these activities should be a more professional community of health science library personnel who can be more aggressive in delivering health science information. A trained staff will begin to view the library as valuable only as it succeeds in its function as an educational tool and will know that education for the health sciences can mean undergraduate education, technical education, education of interns and residents, and continuing education -- all at the same time.

A state-wide health science library program should be successful in meeting all these needs simultaneously.

In addition to public libraries and non-biomedical academic libraries, all of the hospital libraries in the state should have the basic materials listed above, with a somewhat expanded core reference collection. Because these libraries will have holdings of medical and allied health journals, they will fill requests for copies of journal articles. This de-centralization of the interlibrary loan system follows a developing national pattern; the present contract of the Midwest Regional Medical Library with the National Library of Medicine calls for a de-centralized plan, providing for reimbursement, not only to the resource library, but to the smaller units providing document delivery services in their area.

The interlibrary loan demands upon any one institution will increase, but the paths by which the interlibrary loan transactions are fulfilled will soon become formalized and service throughout the state should experience general improvement. Many physicians indicate a need for information to help in their practices. Improved interlibrary service would provide for the most important kind of continuing education information conveniently supplied to meet an immediate need. Such service might also be instrumental in recruiting the health professionals of the next generation; general users, high school biology students and the like, would have access to Index Medicus and related materials for the first time.

2. Development of the most useful kinds of Union Catalogs and Union Lists of Serials

Every health professional or student in North Dakota should have convenient access to the basic locator tools for health science materials in the state: a union

catalog and a union list of serials. At the present time a large part of the state's biomedical holdings can be found in the North Dakota Union List of Serials; this coverage should be extended to include all of the health related journal titles in the state. Other union lists are available to North Dakota's health science libraries, such as the W-I-M (Wisconsin-Illinois-Minnesota) List of medical holdings, produced at the Mayo Clinic Library. For a relatively small initial cost the health science holdings of North Dakota could be included in this list, and each participating library would receive a copy.

The North Dakota Health Science Union Catalog would meet the information needs of many groups with relative ease. Cards of every catalogued title in the health sciences and related subjects in any North Dakota library could be placed in the catalog, along with notation indicating the location of each book. At least one copy of the catalog should be located in each AHEC area, with additional copies in more isolated locations where non-professional and/or voluntary staff could be trained to keep the catalog up-to-date. The catalog could be developed in card form, with adequate cabinet space in each location, and put into book form later, so that more libraries could have a copy.

3. Establishment of Bibliographic Centers in North Dakota

A great many specialized locator tools, such as abstracts and indexes in several basic and clinical sciences, are not generally available to health professionals in North Dakota. There is a strong need for the establishment of one or two comprehensive reference collections which would serve the state as bibliographic centers and make available to researchers, teachers, and clinicians alike

the resources of any biomedical library in the world.

A bibliographic center with an orientation toward the basic medical sciences should be established at the University of North Dakota at Grand Forks, building upon the collection of the Harley E. French Medical Library. The library will need, in addition to an expanded collection, larger quarters and a larger professional staff to make maximum use of the collection.

A bibliographic center with an orientation toward the clinical sciences should be established. This collection also could be housed at the University of North Dakota at Grand Forks. Given the present emphasis on de-centralization in plans for medical education, however, another location would be more advisable. A strong clinical reference collection might best serve the state if housed in Fargo at North Dakota State University, building upon the Pharmacy Library's collection and incorporating other holdings, or at the Veterans Administration Center.

The establishment of reference collections with greater depth than is presently available will provide strong information support for the fourth year elective program, for access to the world's biomedical literature will be markedly improved. Fewer seldom-used resources, consequently, will have to be collected in North Dakota. State-wide use of the bibliographic centers by both undergraduate and graduate medical students will probably be active from the beginning, for under the "2:1:1 Plan" those who spend a year at the Mayo Clinic and the University of Minnesota will become familiar with the collections and services of large biomedical libraries.

4. Organization of Cooperative Storage Facilities

The present (and probably future) economic situation demands real cooperation among health science libraries. It has been said that cooperation is a term to which all librarians give lip service but to which few of them wish really to commit themselves. In North Dakota there can be a real financial advantage in promoting cooperation among libraries in order to gain access to resources and services which cannot be obtained individually.

The first truly cooperative activity among health science libraries in North Dakota can be the organization and maintenance of cooperative storage facilities. Under ordinary circumstances no hospital library needs to give shelf space to issues of journals more than five years old, unless a librarian finds that his library's clientele uses a particular title heavily, and then a ten-year run of that title may be kept. Many use studies have shown that more than 90% of journal usage falls within the literature published during the past ten years, so there is no need to maintain in any of the local AHEC areas more than a ten-year run of any except the most popular titles. The maintenance at a central location of a ten-year run of each title collected in that AHEC will serve the local information needs generated by the standard reference tools.

The state should maintain complete back files of all the titles collected in the state. These titles can be stored at or near the proposed bibliographic centers for easy access and retrieval. Some of the back files might be kept on microfilm. A request from any of the contact librarians for an article from a journal issue in storage should receive immediate attention by the document delivery staff, with a

photocopy of the requested article mailed out the same day.

Central storage capability will be an economical way to provide a maximum collection to the health professionals of the state. The system will save valuable space, which is lacking in North Dakota's health science libraries, and it will save the cost of binding for the small libraries which can keep five-year runs of journals in file boxes on the shelves.

5. Coordination of library activities to facilitate Cooperative Technical and Reference Services.

In addition to storing information, libraries should be actively involved in improving access to it. Utilization of the developing technology of information science can result in an improved information flow to busy practitioners. For the professional librarian this goal involves a two-fold process: first, putting information into a form that other people can use, and then getting that information out to people who need it, both in the medical centers and in the smaller medical and health science facilities. The concept of "retrieval" is being given a much more active emphasis than in the past. Each library in a state-wide system should be actively engaged in retrieval, serving as a center for disseminating health science information to the consumers of that information as quickly as possible.

Since most of the health science library personnel in North Dakota are non-professionals, it will be an impossible task for them to emphasize the retrieval function over the storage function without the provision of two major sources of aid. The first, in which nearly all of the library personnel have expressed an interest, is a Central Processing Office to provide the necessary technical services

on a statewide basis to all biomedical and health science libraries in North Dakota. The Central Processing Office would be headed by a professional librarian with specialized training and experience in technical services, which include acquisitions, classifying, cataloging, serials control, and maintaining the proper statistical records related to those functions.

All health science libraries in North Dakota could order their books through the processing office; the books would arrive fully cataloged with cards ready to be inserted into the local card catalog. Duplicate cards, or notice of the book's addition to the collection, would also be sent to the union catalogs located around the state. In order to participate, all health science libraries would have to adopt the classification system of the National Library of Medicine, as most have done or are now in the process of doing.

The Central Processing Office could be located anywhere in the state, but it should have access to a Medline terminal for easy use of the Catline data base at the National Library of Medicine. The main advantage of establishing a central office for technical services will be the elimination of the enormous amount of duplication of effort now going on in North Dakota's health science libraries. It now costs more than the price of a book to process that book for the shelves -- and that in the most efficient academic libraries. In addition, serials control by computer would be feasible as a state-wide project.

Duplication of processing effort is the most expensive item in the library budget of the health science community of the state. One graphic example will suffice: in a large hospital library in the state a non-professional librarian, in

converting to the NLM classification system, is doing original classifying of the collection because she did not know that it has already been done for her and is available in the NLM Current Catalog. She was among the most enthusiastic in support of the idea of a Central Processing Office, because she has very little time to do anything other than prepare the collection for proper storage.

Cooperative Acquisitions

Another advantage resulting from a central office for technical services is the impetus toward cooperative acquisitions that such an office would provide. In making more efficient use of funds for buying library resources and materials, the state would increase the capability of improving the health science resources available. Cooperation in acquisitions is the next logical step beyond cooperative storage.

Each AHEC area would have within its boundaries certain "core" journals, those basic titles considered essential. Beyond that level each AHEC area would maintain a collection of titles unique to that area and available to every health professional in the state by the interlibrary loan system. The specific titles would be determined by the special emphasis in medical and allied health education and practice developed in each area. Some libraries will then be able to give up subscribing to some journal titles as long as another library in the state will commit itself to collecting those titles, thus freeing funds for additional titles. The cooperative acquisitions plan would be administered by the Central Processing Office, which could make maximum use of the Medical Library Association Exchange to acquire missing items in the collections around the state.

Collection improvement will also involve the wider definition of materials appropriate to a health science collection. In order to serve the increasingly diverse users of his library, the health science librarian is broadening his concept of the materials appropriate to his collection. One of the physicians responding to the questionnaire requested materials in areas where medicine, sociology, anthropology, and economics converge. Such broader collections will better serve family practice programs.

Audiovisual Services.

Not only are the subjects of the materials collected by health science libraries broadening, but the form of their publication is changing as well. The greatest growth of audiovisual materials is taking place in the fields related to medicine, and libraries serving medical and related health education programs are acquiring more films, slides, audiotapes, videotapes, and other forms than in the past. This trend toward managing information in media other than print will require additional physical quarters in the library and personnel to service such material and its equipment.

Health professionals should not have to know how to use all the new kinds of audiovisual hardware and to employ the continuing technological improvements in the field in order to retrieve the enormous amount of good biomedical information presently stored in audiovisual software formats. This is an important area of need in which a state-wide health science library system should be able to give real help. An expert in the field of audiovisuals can coordinate the acquisition and maintenance of equipment throughout the state. This staff member would work

with the state health science library coordinator to plan cooperative acquisitions of appropriate software materials and with the Central Processing Office to maintain proper bibliographic records of them. If this position cannot be filled at an early date with a well-trained person in the field, perhaps the state can contract with one or both of the state universities for such services.

Cooperative Reference Service.

The goal of an improved information service is, ultimately, better health care for the people of North Dakota, whether that care is given by physicians, dentists, nurses, clinical psychologists, dieticians, or all the various technical fields. All health professionals need good information. A library supplies information through the department traditionally known as the reference service.

Many types of reference service can be expected from the reference department of a good biomedical library. One type supports the interlibrary loan and document delivery functions by verifying the bibliographic accuracy of requests being sent out. Another answers specific requests for information on a given subject. These answers may range from simple facts from a single source to summaries requiring the collection and synthesis of facts from several sources. A complex question may result in a review of the literature on a subject, compiled by a librarian who is a subject specialist, but more often it results in one of a number of citation services, or lists of bibliographic citations. These lists are compiled by manual searches of many sources or computer searches of several data banks.

Another type of service which supplies a list of bibliographic citations is

called the selective dissemination of information (SDI), for which a profile of the special interests of a given health professional is kept, and a list of current articles in his field is sent to him on a regular basis. The National Library of Medicine has recently added SDIline to its range of Medline services.

No medical or allied health library in North Dakota is now providing a full range of services, yet these can be made available to the state's health professionals with little duplication of basic technical effort and with the additional benefit of increased specialization in types of services offered. A coordinator for health science information services is needed to coordinate the reference efforts of the contact librarians in hospital libraries and public libraries with those of the larger resource libraries. The person filling this position must be a professional librarian with specialization in the literature of the health sciences and professional work experience in health science libraries. Such a person should have a general overview of the developing national Biomedical Communications Network in order to understand how North Dakota's state-wide health science library system might best be able to interface with that network.

It would be the task of the coordinator of library services to work with the coordinator of technical services and the coordinator of audiovisual services to provide the best possible support for the professional activities of the contact libraries, whether in hospital or public libraries. It would also be the responsibility of this person to carry out the improvements in interlibrary loan services described above.

A future responsibility of this position should be the integration of high

school libraries and junior high school libraries into a state-wide system of the dissemination of health science information. A study by Rogoff (15) showed that 47% of a population of medical students had decided before the end of high school to enter medicine. The provision of access to biomedical literature and audio-visual materials for these students would help to insure an adequate number of health professionals practicing in North Dakota in the next generation.

If North Dakota can develop library capability to support its medical education program up through the level of cooperative technical and reference services, it will have developed a viable North Dakota Health Science Information Network. The network will need equipment to facilitate information flow. Teletype writer printer (TWX) connections from the smaller libraries around the state (certainly one in each AHEC area) to the central facilities of the biomedical libraries would facilitate interlibrary loan by providing hard copies of requests and would provide easier access to the complex data files at the National Library of Medicine and elsewhere, again by providing hard copies of requests.

At at least one site, and possibly four, the state must have access to the on-line data files of the nation by means of a computer terminal. The first step in a national health science information network is the on-line query of data bases from remote terminals. The first terminal in North Dakota should be located at the site of the Central Processing Office, to give that office access to Catline, probably at the University of North Dakota but possibly at another health science library within the state.

The capacity for the storage and retrieval of information in microform will

be needed by the North Dakota network. The acquisition of microtexts and the equipment required for their use should be coordinated according to the plan for acquiring general library resources outlined above.

6. Center for comprehensive information service.

A library center providing a comprehensive information service should be able to give any patron at any time any item(s) of information requested in any form required. Such a library would have exhaustive collections in every pertinent field, so that almost any document is immediately available. Services would include custom translating in many languages, specialized current awareness alerting procedures, and the expertise of a large staff of subject specialists with advanced degrees in many fields of science and with the ability to index, abstract, or compile all types of bibliographies. In addition to standard photocopying equipment, the library center would make available equipment for microcopying in any of the standard forms and a staff of technical experts to operate the equipment. Obviously few libraries presently meet this standard.

North Dakota has little need for such expensive and specialized services before equalizing access to basic information sources. Some of the capabilities of a center for comprehensive information service can be developed within the framework of cooperative reference services described above. The state's health science librarians can learn how to gain quick access to the nation's translation centers, notably the one at the John Crerar Library in Chicago. Widespread subscriptions to Current Contents can provide manual current awareness service, while a search of the SDIline data base by computer terminal can give lists of current articles on

almost any health-related subject.

With cooperative reference services a plan can be developed by which each local AHEC librarian will gain a certain subject expertise in those clinical specialities prominent in his area. This subject expertise will enable him to perform many important tasks for the state's health science community as a whole, from "current awareness" service and special bibliographies when time permits to selection of books and journals in his fields of competence for other libraries.

Capacity for microcopying can be developed gradually as such forms achieve greater acceptibility. The photoduplication of an article in hard copy might cost four dollars, while the same article on microfiche costs only 65¢; the economy of using microforms is generally overcoming user resistance.

In the future North Dakota's health science libraries should be involved in the provision of sophisticated audiovisual support services for increasingly expanding health education programs. These services can include computer assisted instruction, telecommunication of grand rounds to remote viewers, and linkage of the requestor with a remote knowledge source by telecommunication.

Specific Recommendations for Personnel, Library Resources, and Physical Facilities

Personnel

Only professionally educated librarians can provide the information services which the state's health care community presently needs. The state should begin immediately to recruit a staff of professional librarians and to formulate a policy of personnel development that allows for the continuous updating of those librarians in professional practices in relation to the Biomedical Communications Network.

This personnel should be fully equipped to perform the librarian's major role, that of interface between knowledge and the user.

The organizational structure for the state's staff of health science librarians should be one of decentralized operations administered locally in each AHEC by a professional librarian and aided and served by a decentralized "core" staff. The core staff should include a coordinator of health science library services, a coordinator of technical services, and a coordinator of audiovisual services. All professional health science librarians serving the University of North Dakota Medical School should have appropriate faculty status and benefits.

Appropriate beginning salaries for North Dakota's health science librarians should fall into the following ranges:

Directors of biomedical libraries	$16,000 - 20,000
Coordinator of health science information services	$16,000 - 18,000
Coordinator of technical services	$15,000 - 17,000
Coordinator of audiovisual services	$15,000 - 17,000
AHEC librarians	$13,000 - 15,000

Adequate clerical support must also be provided at appropriate salaries.

As the larger libraries begin to fill the role of resource libraries to the state, there will be a need for additional public services staff; perhaps those salaries will be a local responsibility.

Library resources

The ratio of salaries to expenditures for library materials is roughly 2 to 1. Excluding any expenses for maintenance of the physical facilities, medical libraries spend between 60 and 79 percent of their budgets for library staff and the rest for books, journals, and other library resources. Of course the percentage spent for materials will be higher if a library is initiating a strong acquisitions program.

At the present time, North Dakota should be spending between $45,000-$50,000 a year for journal subscriptions, at least $25,000 for books, and another $25,000 for teletypewriter and Medline service and audiovisual materials. It is difficult to estimate what percentage of these figures the University of North Dakota should be spending, and what amount should be the responsibility of the local libraries. Currently budgeting for personnel and resources by all health science libraries is inadequate, and wasteful duplication compounds the problem.

Physical facilities

North Dakota needs two new biomedical library facilities, one in Grand Forks and one in Fargo. Costs for these cannot be estimated with any accuracy until the librarian, working with an architect, can plan a building program which allows for local needs and circumstances.

The Quain and Ramstad Clinic Library in Bismarck and the Cameron Library in Minot should remodel to expand into existing available space. Where remodeling becomes too complex an operation, however, a building program should be considered. Librarians with experience in the matter always say that it costs more to remodel than to build an equal facility; the Mayo Clinic Library has found that remodeling requires one and four-fifths times as much as building an equal space (16).

Sources of funding

A library today has a greater opportunity to receive grant funding from federal and private sources if it is involved in full cooperation in an innovative system than if it is trying to develop into a self-sufficient unit. In addition to its Resource Improvement Grant and its Project Grant, the National Library of Medicine funds a Consortium Grant, for which a developing North Dakota Health Science Information Network could be eligible.

In addition, several private foundations fund innovative programs related to medical education and the improvement of medical care.

Minimum requirements

In order to serve the expanded medical education program with any degree of adequacy, the medical school should develop its library service capability through a minimum of level 4 with partial competence at level 5. This capability would include expanded interlibrary loan service, greater participation in union lists of serials, development of bibliographic centers and cooperative storage facilities, and as much coordination as possible of reference services.

Although cooperative technical services are recommended in the strongest

possible way, the state may not find it feasible to develop such services at the present time. Without centralized technical processing the union catalog project of level 2 would be very difficult to accomplish. Cooperative selection and acquisitions of materials would also be less feasible, making cooperative reference work more difficult.

Minimum improvement of present library services would still require the augmentation of the collections. Several professional medical librarians must be recruited, in perhaps greater numbers than a fully cooperative service would require. New facilities in Grand Forks and Fargo and expanded facilities in Bismarck and Minot should be provided.

Evaluation

The question of evaluation is the critical question in library work as well as in any other kind of work. The American Medical Association and the American Hospital Association have been working with the Medical Library Association on a project, funded by the National Library of Medicine, to develop a data-collection-and-analysis program and to build a national data bank for health science libraries. Such a bank will be useful to North Dakota for judging its present and future plans against a national standard. In addition the Medical Library Association has a Committee on Surveys and Statistics which enjoys the services of several medical librarians active in experimentation in library methodology.

At the present time the criteria used for library performance are the traditional quantitative statistics. These are intended to measure the actual utilization of library services and the relative strength of the local collection judged by

the availability of materials. These measurements include counting documents delivered and computing the delivery times, counting reference requests answered or otherwise filled, and computing costs. Such statistical records help the library administrator, as some librarian put it, to do "the same old thing better and faster." Attempts to determine intramural library use not involving circulation statistics are still quite primitive.

Emphasis in library evaluation is increasingly being placed on qualitive measurement. The planner of information services needs to be able to measure the effectiveness of information transfer rather than merely the number of documents delivered. Qualitative evaluation of resource development should be able to indicate where the resources should be located, what criteria should be used to determine the optimum size of the collection, and what is a desirable level of state-wide self-sufficiency. Before these questions can be answered and the process of effective information transfer be evaluated, much methodological innovation is required.

All health science libraries in North Dakota must be required to keep standard quantitative statistical records. A common form should be developed for state-wide use so that the data can be easily evaluated.

Postscript

North Dakota has committed itself to one of the most innovative medical education programs in the nation. The state stands at a crossroads in terms of development of health science information support services. Library services for

large medical centers are entering into consortia and forming networks in order to avoid expensive duplication of effort and resources. Where a state-wide program of medical and allied health education is envisioned as a network, it is even more imperative that library support services also be developed into a viable network.

The most pressing immediate need for health science library development in North Dakota is administration and staff with vision which goes beyond the concept of "place" as an organizing principle. The need for information of North Dakota's health care practitioners must become the organizing principle of the North Dakota Health Science Information Network.

IV. CALENDAR FOR DEVELOPMENT: 1973-1978

Year I. Fall 1973-Fall 1974.

Recruit Coordinator of Health Science Information Services.

Recruit Coordinator of Technical Services.

Recruit Coordinator of Audiovisual Services.

Investigate sources of funding; coordinate grant proposal efforts.

Recruit AHEC Librarians.

With the four Directors of Health Education, plan AHEC libraries.

Recruit staff for Central Processing Office.

Begin state-wide assessment of audiovisual needs.

Acquire Medline terminal(s) and send Librarian(s) to the National Library of Medicine to be trained in Medline searching.

Acquire TWX equipment.

Year II. Fall 1974-Fall 1975.

Determine the location of each "contact library" in the state.

Develop workshops for contact library personnel.

Place "core" reference materials in contact libraries.

Begin operation of Central Processing Office.

With Directors of Clinical Specialities, assess collections in each teaching area.

With Director and Coordinator for Allied Health, assess collections in each field.

Initiate Pilot Project: at one small hospital or clinic library begin a full range of information services on an experimental basis.

Year II, cont.

Initiate a study to determine interlibrary loan request routes and document delivery routes.

Initiate a study to determine reference request routes.

Begin state-wide use of "core" audiovisual materials.

Begin development of coordinated collections to support residency programs.

Begin to develop services and resources for clinical elective programs.

Begin to develop services and resources for continuing education courses.

Year III. Fall 1975-Fall 1976.

Evaluate Pilot Project.

Evaluate interlibrary loan study and begin to design efficient state-wide document delivery routes.

Evaluate reference request study and begin to design efficient state-wide reference question routes.

Evaluate use of audiovisual materials.

Continue workshops for contact library personnel.

Evaluate use of core reference materials in contact libraries.

Continue to develop services and resources for clinical elective programs.

Adjust library resource development plan after curriculum is made.

Continue to develop services and resources to support residency programs.

Continue to develop services and resources for continuing education courses.

Initiate a plan to extend library services in areas where future allied health programs are likely to develop.

Year IV. Fall 1976-Fall 1977.

Evaluate operation of the Central Processing Office.

Re-evaluate the efficiency of document delivery routes.

With Directors of Clinical Specialities, re-evaluate resources in each teaching area.

Continue workshops for contact library personnel.

Continue evaluation of use of reference materials in contact libraries.

Continue to develop audiovisual services and resources.

Continue to develop services and resources for clinical electives.

Continue to develop services and resources to support residency programs.

Continue to develop services and resources for continuing education courses.

Year V. Fall 1977-Fall 1978.

Re-evaluate efficiency of reference request routes.

With Directors of Clinical Specialities, continue re-evaluation of collections in each teaching area.

With Director and Coordinator for Allied Health, re-evaluate collections in each field.

Continue workshops for contact library personnel.

Continue to develop audiovisual services and resources.

Continue to develop services and resources for clinical electives.

Continue to develop services and resources for continuing education courses.

Continue to develop services and resources to support residency programs.

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